Understanding the Importance of SAF Modeling

Understanding the Different Approaches to Sustainable Aviation Fuel with a Focus on Corn Ethanol

CORSIA and the new 40B SAF GREET model play a pivotal role in evaluating the environmental impact of sustainable aviation fuels (SAF), particularly their carbon intensity (CI) or the amount of greenhouse gases they emit compared to traditional jet fuel.

Both models look at the entire lifecycle of fuel, from how it's made to how it's burned in an airplane. They were created to provide certainty and transparency in emissions accounting within the global SAF space, with the goal of decarbonizing the aviation sector.

CORSIA	40B SAF GREET
A **global standard** by the International Civil Aviation Organization (ICAO).	**Nations can leverage this tool for LCA-based emission** offset calculations and policymaking (e.g., tax incentives, like IRA).
Mandatory for international aviation emission offsets, but non-binding for domestic aviation LCA-based policies.	**An optional tool for individual countries' aviation** LCA policies in emission offset calculations.
A more **cautious approach to land use** change, prioritizing a comprehensive global assessment of indirect land use effects.	A **data-driven approach to land use** change, integrating regional and crop-specific impacts.
Models the **life cycle emissions** of corn ethanol-based SAF, but default parameters exclude carbon capture and sequestration (CCS), climate-smart agriculture (CSA), and specific renewable energy applications.	Models a **broader range of SAF pathways**, incorporating CCS, CSA, and diverse renewable energy sources as user-defined parameters.
Corn ethanol-based SAF currently does not qualify for the U.S. IRA tax credits because it does **not achieve the required 50% reduction** compared to petroleum jet fuel using CORSIA, even with the inclusion of CCS.	Integrating CCS and/or CSA with corn ethanol-based SAF **enables a greater than 50% reduction** in lifecycle GHG emissions compared to conventional jet fuel.

CORSIA, the International Air Transport Association's (IATA) global standard, with its stricter, more conservative criteria, might disincentivize the production of some SAF pathways, potentially slowing decarbonization efforts. However, the 40B SAF GREET model's inclusion of Carbon Capture and Sequestration (CCS) and Climate Smart Agriculture (CSA) practices, which offer a combined reduction of 40 g/MJ in CI not recognized under CORSIA, could incentivize their adoption and lead to significant emissions reductions in corn farming and ethanol production.

Direct land use change (DLUC) refers to the related emissions produced directly from the land converted for corn production.

Indirect land use change (ILUC) occurs when farmers elsewhere *(global consideration)* change the use of the land to grow crops for food to replace the corn now used for fuel.

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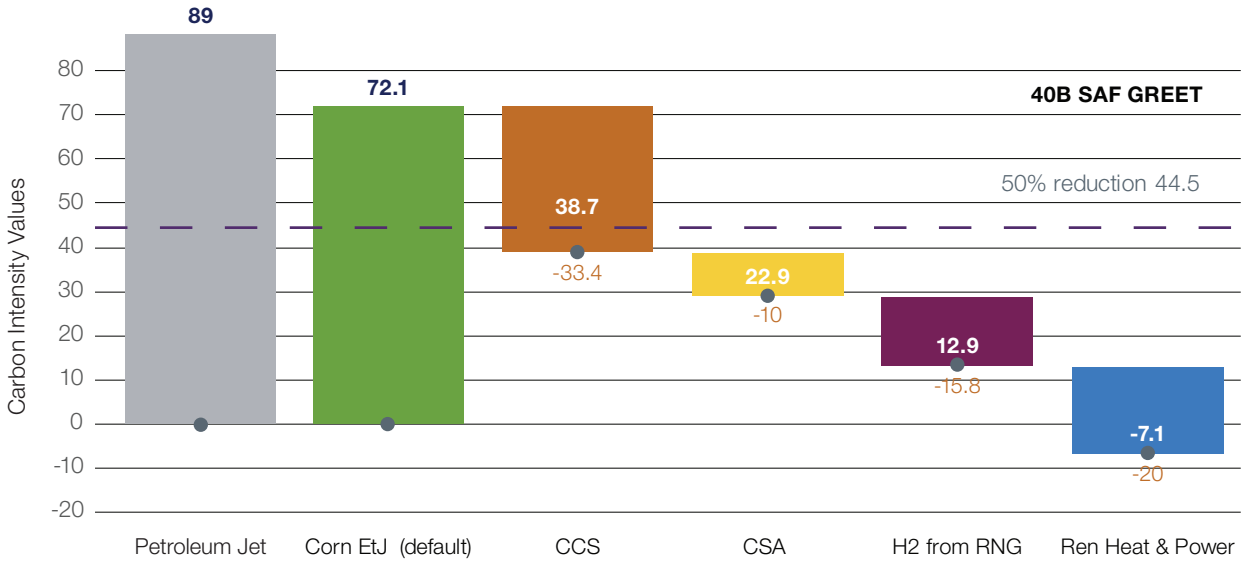
U.S. Ethanol Competitiveness within Emerging Global ETJ SAF Markets Dependent on Modeling

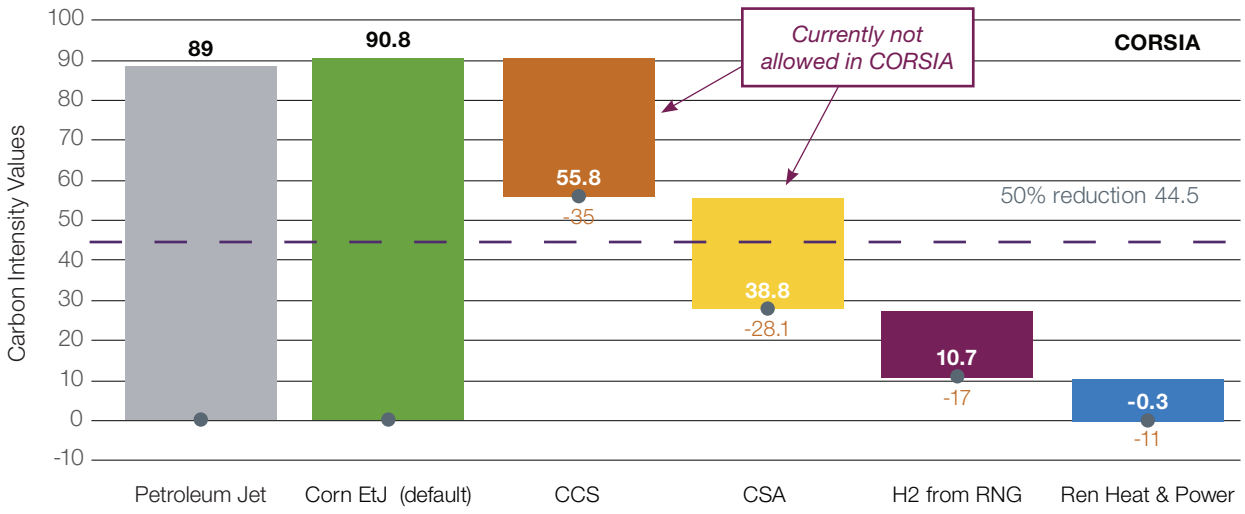
Carbon Intensity Reduction Potential of U.S. Corn Ethanol in Jet Fuel

Under the DOE GREET40B Model and the ICAO CORISA Model

GREET 40B



CORSIA



* Charts for illustration purposes only. | Default EJT in GREET 40B chart uses standalone configuration with corn oil extraction. | CCS = carbon capture and sequestration. CCS technology is not currently recognized by CORSIA; the figure in the CORSIA chart assumes a hypothetical scenario where CCS is accepted in the policy. | CSA = climate smart agriculture. The figure of CSA Offsets in the CORSIA chart shows indirect CI reduction through carbon offsets from regenerative agricultural practices assuming same inputs in GREET 40B.